

Authors

A. Eugene Blakeslee

Research Division, Yorktown Heights, New York

Dr. Blakeslee has been a member of the crystal synthesis group at the Thomas J. Watson Research Center since 1966, having joined IBM in 1962 and having held previous assignments in the Components Division and with the World Trade Corporation in Boeblingen, Germany. His IBM research has centered around the vapor growth of semiconductor crystals and the characterization and application of these crystals to electronic devices. Previous experience with General Electric and Bell Laboratories was in the same field. Dr. Blakeslee earned his Ph.D. from Cornell University in 1955 and holds a B.S. in chemistry from Pennsylvania State University. He is a member of the Electrochemical Society and Sigma Xi.

Norman F. Brickman

System Products Division, Poughkeepsie, New York

Dr. Brickman is on the staff of IBM Fellow Joseph C. Logue at the development laboratory, where he joined IBM in 1969. His current technical interests include system design procedures and design automation associated with the use of programmable logic arrays and sensor-based computer applications. Previous IBM work has included memory design and development and mathematical support work in areas such as yield analysis and statistical analysis. He received a B.S. in electrical engineering in 1963 from Johns Hopkins University, and an M.S. and a Ph.D. in low temperature physics from Yale University in 1964 and 1969. Dr. Brickman is a member of the American Physical Society and the Institute of Electrical and Electronics Engineers.

Harold Fleisher

System Products Division, Poughkeepsie, New York

Dr. Fleisher was recently appointed an IBM Fellow in recognition of his contributions to optical data processing, computer systems, logic design, and array logic. He joined IBM in 1950 at the Advanced Development Laboratory, which later became the Research Division. Dr. Fleisher was a staff member of the Radiation Laboratory of the Massachusetts Institute of Technology from 1943 to 1945, a senior engineer at the Rauland Corporation, Chicago, during 1946, and an instructor in physics at Case Western Reserve University from 1946 to 1950. He received a B.A. in 1942 and an M.S. in 1943, both in physics and optics, from the University of Rochester, and a Ph.D. in

1951 in physics from Case Western Reserve University. He received an IBM Outstanding Invention Award in 1965 for a transistor EXCLUSIVE OR logic circuit. Dr. Fleisher is a member of the American Physical Society and Sigma Xi, and is a Fellow of the Institute of Electrical and Electronics Engineers.

Anthony Hornung

System Products Division, East Fishkill, New York

Mr. Hornung is a member of the semiconductor advanced product unit in East Fishkill, where he joined IBM in 1964. He is currently an advisory engineer in the Reliability and Qualification department. At present he is evaluating and qualifying advanced bipolar devices; in the past he has worked on various reliability tasks ranging from discreet bipolar devices to complementary FET-LSI designs. Mr. Hornung has published papers on silver diffusion and molybdenum corrosion kinetics. He received a B.A.Sc. in engineering physics from the University of Waterloo, Canada, in 1964 and an M.S. in physics from Syracuse University in 1968.

Frank E. Howley

System Products Division, Poughkeepsie, New York

Mr. Howley is a senior engineer on the staff of IBM Fellow Joseph C. Logue, where his current technical interest is in system applications of array logic. He has also recently been involved in mini-processor architecture and design. He joined IBM from RCA Research Laboratories, Montreal, in 1960. He was employed by Computing Devices of Canada from 1953 to 1957 subsequent to receiving a B.Sc. in mathematics from London University.

John Wyn Jones

IBM United Kingdom, Winchester, Hampshire, England

Mr. Jones joined IBM at the Hursley laboratory in 1962. He recently completed a two-year assignment in IBM Fellow Joseph C. Logue's program, where he was involved with the exploitation of array logic in the LSI time frame. Mr. Jones received the Higher National Certificate in 1953 from the Swansea Technical College in South Wales. He is a member of the Institute of Electrical Engineers.

Lucian A. Kasprzak

System Products Division, East Fishkill, New York

Dr. Kasprzak is an advisory engineer working on LSI reliability. He joined IBM in 1965 and has worked in the fields of failure analysis, scanning electron microscopy, the electron microprobe, laser scanning, MOS development and MOSFET and bipolar LSI reliability. He received a B.S. in physics from Stevens Institute of Technology in 1965 and an M.S. in physics from Syracuse University in 1970. He did further graduate work under an IBM Resident Fellowship and received a Ph.D. from Stevens Institute of Technology in 1972. His doctoral research was done at the Thomas J. Watson Research Center on MOS memory gate structures with small metal particles and

tunneling in ultra-thin silicon dioxide films. Dr. Kasprzak is a member of the American Physical Society, the American Vacuum Society, the Electrochemical Society, and the American Association of Physics Teachers.

Huei Ling

Data Processing Product Group, White Plains, New York

Dr. Ling works with the forecasting group at DP Product Group headquarters. He received his B.Sc. from the National Taiwan University in 1957, his M.Sc. from the University of New Brunswick in 1961, and his Ph.D. in electrical engineering from the University of Oklahoma in 1965. Dr. Ling was a method supervisor with Bell Telephone of Canada in 1961, an electronics engineer with Sundstrand Aviation from 1962 to 1963, and an Associate Professor at Florida State University in 1965. He joined IBM in 1965 at the Research Laboratory in San Jose. He is a member of the Association for Computing Machinery and the Institute of Electrical and Electronics Engineers.

Joseph C. Logue

System Products Division, Poughkeepsie, New York

Mr. Logue was appointed an IBM Fellow in 1971 and is currently involved with the utilization of array logic in both small and large systems. He joined IBM in 1951 in Poughkeepsie and assisted in the development of the electrostatic memory for the 701 computer. During the period from 1952 to 1959 he directed IBM's transistor circuit development effort. From 1960 to 1967 he had responsibility for a number of advanced development and product programs including memories, tape drives, displays, and large systems, and from 1967 to 1970 he was staff director of IBM's Corporate Technical Committee. He received a B.E.E. in 1944 and an M.E.E. in 1949 from Cornell University and taught courses in the electrical engineering department at Cornell as a full time instructor from 1944 to 1949. As an Assistant Professor on leave from Cornell from 1949 to 1951, he contributed to the design of the radio frequency controls of the Cosmotron at Brookhaven National Laboratory. Mr. Logue is a coauthor with L. P. Hunter of the 1956 edition of the *Handbook of Semiconductor Electronics*. He is a Fellow of the Institute of Electrical and Electronics Engineers, a member of Eta Kappa Nu, Phi Kappa Phi, Sigma Xi, and the American Association for the Advancement of Science.

Joseph A. Lukes

System Development Division, Palo Alto, California

Dr. Lukes is an advisory engineer with the advanced data systems evaluation group and is involved in performance evaluation of storage subsystems. He joined IBM in 1967 as a logic designer in the System Development Division in Menlo Park, California. He obtained a Ph.D. in electrical engineering from Stanford University in 1972. Dr. Lukes is a member of the Institute of Electrical and Electronics Engineers, the American Association for the Advancement of Science, Tau Beta Pi, Pi Mu Epsilon, Eta Kappa Nu, Phi Kappa Phi, and Sigma Xi.

John E. MacDonald, Jr.

System Development Division, Poughkeepsie, New York

Dr. MacDonald is a senior engineer at the Poughkeepsie laboratory and is currently working on system measurement and evaluation techniques. Dr. MacDonald joined IBM in 1952 and has held assignments in logical design of the Project Sage computer, design of error-correcting codes, development of reliability techniques, and system modeling. He received a B.S. in electrical engineering from Purdue University in 1948, an M.E.E. from Syracuse University in 1958, and a Ph.D. in electrical engineering from the University of Illinois in 1965. In 1960 he received an IBM Fellowship for graduate study. Dr. MacDonald is a member of the American Mathematical Association.

Siegfried R. Mader

Research Division, Yorktown Heights, New York

Dr. Mader joined the Research Division in 1961 and is presently manager of the structure research group in the Physical Science department at the Thomas J. Watson Research Center. He has studied a broad spectrum of metallurgical structures ranging from amorphous metal films to single-crystal semiconducting materials and is currently interested in lattice defects in semiconductors. He received a Ph.D. in physics in 1957 from the University of Stuttgart, Germany, and in 1971 returned there for a sabbatical year. Dr. Mader is a member of the American Physical Society and the American Vacuum Society, in which he is the current chairman of the Thin Film Division.

Ingrid Magdo

System Products Division, East Fishkill, New York

Mrs. Magdo is an advisory engineer in the advanced logic product development group. She has been with IBM since 1967 and her education includes a B.S. from the Technical Institute of Vienna and an M. S. from Lehigh University, both in electrical engineering. Before joining IBM she worked with the General Electric Company on semiconductor development. Prior to that she had been a physics instructor at Lafayette College, Easton, Pennsylvania, and worked at Bell Telephone Laboratories, Allentown, Pennsylvania, on quartz crystal development. Mrs. Magdo is a member of the Electrochemical Society.

Steven Magdo

System Products Division, East Fishkill, New York

Dr. Magdo is an advisory engineer in the advanced logic product development group, where he is currently engaged in the development of space-charge-limited transistors on high-resistivity substrates. Before joining IBM in 1967 he worked for two years with the General Electric Company on development and application of GaAs and Nd:YAG lasers and light-emitting diodes. He had previously worked on electron-tube development at the Bell Telephone Laboratories in Allentown, Pennsylvania, and at the United Incandescent Lamp and Electrical Company in Budapest, Hungary. From 1952 to 1956 he did research on electron-tube theory as a Fellow of the Hungarian Academy of Sciences. His degrees include the Diplom In-

genieur in electrical and mechanical engineering from the Technical University of Budapest, 1950, an M.S., 1962, and a Ph.D., 1964, in electrical engineering from Lehigh University, Bethlehem, Pennsylvania. Dr. Magdo is a member of the Institute of Electrical and Electronics Engineers.

Leon I. Maissel

System Products Division, Poughkeepsie, New York

Dr. Maissel joined IBM in Poughkeepsie in 1960. He has done a variety of thin film work and has a major role in the development of the rf sputtering process which is now being used in manufacturing semiconductor devices. He received an IBM Outstanding Contribution Award for this work in 1969. Since 1970 he has been working on the general problem of array logic with special emphasis on the development of associated design aids. He is currently on the staff of IBM Fellow Harold Fleisher. Prior to coming to IBM, he worked for the Philco Corporation in Philadelphia where he specialized in metal-semiconductor contacts. He obtained a B.Sc. in physics and chemistry and an M.Sc. in chemistry, both from the University of Cape Town, South Africa, in 1949 and 1952, and a Ph.D. in physics from the Imperial College of Science and Technology of the University of London in 1955. Dr. Maissel has published two books, *An Introduction to Thin Films*, coauthored by Morris Francombe, and *Handbook of Thin Film Technology*, coauthored by Reinhard Glang. He is a member of the American Vacuum Society.

Frank P. Palermo

Research Division, San Jose, California

Dr. Palermo's current interest is in problems of workload characterization for computer systems. Since joining IBM in 1960, he has worked on network problems, coding theory and systems for remote scientific computing; he has recently worked on search algorithms for a relational data base. Before joining IBM, Dr. Palermo taught mathematics at the University of Michigan, Princeton University and Brown University. His education includes a B.S. in mathematics from the Case Institute of Technology in 1949, and an M.S. and a Ph.D. in mathematics from Brown University, which he received in 1952 and 1955, respectively. Dr. Palermo is a member of the American Mathematical Society, the Mathematical Association of America, and Sigma Xi.

Arnold L. Rosenberg

Research Division, Yorktown Heights, New York

Dr. Rosenberg is in the Mathematical Sciences department at the Thomas J. Watson Research Center. His technical interests encompass the theory of computation, with special emphasis on mathematical studies of computational structures. Dr. Rosenberg joined IBM in 1965 as a member of the Computer Science department, where he managed the mathematical studies of computation group. He studied at Harvard University, receiving a B.A. in mathematics in 1962, and an M.A. in 1963 and a Ph.D. in 1966, both in applied mathematics. He is a member of

the Association for Computing Machinery (for which he has served as a National Lecturer), the Society for Industrial and Applied Mathematics, and Sigma Xi.

Kenneth L. Sigworth

System Development Division, Poughkeepsie, New York

Mr. Sigworth is currently an advisory engineer in the advanced systems evaluation area, where he works on the development of analytical modeling techniques. He joined IBM in 1950 as a customer engineer in Detroit, Michigan, and came to Poughkeepsie in 1955 as an instructor in the 700 series of machines. He joined the laboratory in 1959 in special engineering and later was manager of a development group engaged in designing the System/360 Model 50 and the System/370 Model 155. He received a B.S. in electrical engineering from Wayne State University, Detroit, Michigan, in 1950.

James W. Thatcher

Research Division, Yorktown Heights, New York

Dr. Thatcher is a member of the theory of computation group in the Mathematical Sciences department at the Thomas J. Watson Research Center, where he joined IBM in 1963. He received a B.A. in mathematics from Pomona College in 1958 and did graduate work, while holding positions of Research Associate and Staff Programmer, at the University of Michigan, receiving an M.A. in mathematics in 1961 and a Ph.D. in communication sciences in 1963. Dr. Thatcher has been a lecturer in mathematics and Adjunct Associate Professor in electrical engineering at New York University; he was on IBM assignment as Assistant Professor of Mathematics at Fisk University in 1965 and 1966 and on sabbatical leave in 1972 and 1973 as a Senior Visiting Fellow at the School of Artificial Intelligence, Edinburgh University. Dr. Thatcher's principal area of interest is mathematical semantics. He is a member of the Association for Computing Machinery and the American Mathematical Society.

Gernot Urschler

IBM Oesterreich, Vienna, Austria

Dr. Urschler obtained a Ph.D. in mathematics from the University of Vienna in 1967, where he specialized in mathematical logic and set theory. After leaving the university he joined the IBM laboratory in Vienna and participated in various projects, ranging from the formal definition of PL/I (VDL) to investigating parallelism in programming. In 1972 and 1973 he worked with the advanced systems group in the System Development Division laboratory in Endicott and in 1973 and 1974 he spent a year at the Thomas J. Watson Research Center to work in the field of program optimization.

Wei-Wha Wu

System Products Division, Poughkeepsie, New York

Mr. Wu is an advisory engineer on the staff of IBM Fellow Joseph C. Logue, where his current research interests lie in small systems and high performance array logic. He joined IBM at the Thomas J. Watson Research Center in 1962 and while there worked on semiconductor device modeling and memory circuitry. He transferred to his present location in 1965 and at that

time worked on the MST circuit family for System/360 Models 85 and 195; he was also involved in LSI semiconductor processing, device testing and circuit design. From 1959 to 1961 Mr. Wu was a teaching assistant in the Department of Electrical Engineering at the National Taiwan University, Taipei. His education includes a B.S. and an M.S. in electrical engineering from the National Taiwan University in 1957 and the University of Cincinnati in 1962. In 1969 he received an IBM Invention Achievement Award for his contribution to the LSI design.

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